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DELIVERABLE

D4.1 – Shopfloor digital representation and real-time data fusion - Initial version

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Executive Summary

This deliverable describes the implementation and functionalities of the initial versions and next steps within each task of Work Package 4 (WP4) in the **CONVERGING** project.

WP4 is dedicated to the development and implementation of the Big Data Pipeline, composed of the following tasks:

- **Data At Rest module (DAR)** led by AIMEN (Task 4.1)
- **Data In Motion module (DIM)** led by INTRA (Task 4.2)
- **AI Digital Twin module (AIDT)** led by VIS (Task 4.3)
- **Integration and communication architecture** led by INTRA (Task 4.4)

In relation to Data At Rest (DAR), it is a transverse module that uses an architecture based on microservices. The DAR module uses advanced technology and design to optimize data collection, storage, and management. By using Asset Management Shell (AAS) as a generic data model, the DAR module improves the representation of assets in a standardized way.

Meanwhile, the Data In Motion (DIM) module is a component focused on real-time data processing. Built on a MongoDB NoSQL database for fast data processing, DIM aims to exchange data between the different HRC agents in real time, develop robust data models and implement efficient data algorithms. It provides real-time data acquisition, improving the efficiency and scalability of the CONVERGING modules.

Regarding the AI Digital Twin (AIDT) module, it uses VC4.0 software, which enables the creation of a digital twin and integration with ROS, addressing communication between VC4.0 and ROS via a bridge. Integration of algorithms enhances simulation capabilities, emphasizing seamless integration for efficient cell design, testing and simulation.

Finally, the Integration and Communication Architecture within the CONVERGING project serves as the backbone for connectivity and interaction among production resources, software and modules. Using OpenFlow-based AI-SC technology, this framework provides integrated communication channels, enabling data exchange and consistency across modules lifecycle.